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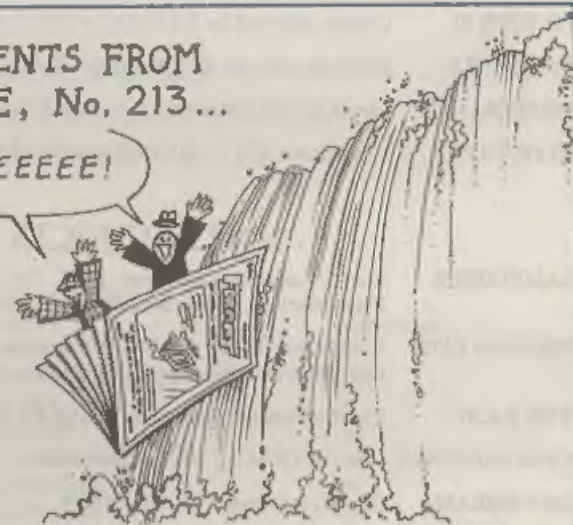
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NEWS ON 4

NEW DISC INTERFACE

We have it on good authority that West Coast Computers are designing a new disc interface for the Spectrum.

While a release is not expected until sometime in the spring, work is now quite advanced. West Coast will be using a new disc controller chip, to get round the shortage of 1772 chips that now plague them, but they promise full compatibility with the DISCIPLE & PLUS D disc format. In fact they are negotiating with S.D. Software for a licence to make Uni-DOS standard on the new but as yet un-named interface.

More details as soon as we have them.

SPECTRUM MEMBRANES

The shortage of Spectrum keyboard membranes could soon be over as W.N. Richardson & Co have committed to have a large batch produced.

So, if your keyboard is showing signs of old age, give Bill Richardson a ring on 0753 888866 and he should be able to help.

FAST NABS RECIDIVIST

FAST, the Federation Against Software Theft, has successfully helped prosecute someone for the second time. David Smith, of Humberside Computer Services, pleaded guilty to 14 specimen charges on the sale of illegally copied software.

Smith was found guilty in 1990 following raids by Trading Standards and while awaiting trial on that case was found to be continuing his operation. For those offences he was prosecuted and fined a total of £2,500.

Now he has been in court again for new offences. Following his guilty plea to the latest set of charges he now awaits sentencing which could involve a prison sentence.

FAST point out that they have now built a good working relationship with the Trading Standards people (who normally only operate on a local basis) and this is allowing illegal software to be traced much more effectively.

TRADE-IN TO RESTART

Following the great success of their Spectrum trade-in scheme last summer, West Coast have decided to relaunch the idea starting from the 1st January.

Under the new scheme a working Spectrum with power supply and manual will get you a £40 discount on a new 512K Sam with single drive. However, you can also get a £50 off a dual drive machine or £30 off a Sam with external drive interface.

In a break with prior practice West Coast are also offering the same discount levels for working Commodore 64s (with tape units, PSU and manual) or Amstrad CPC machines (again with all the bits).

They will also offer Amiga owners the chance to upgrade to Sam by offering them £50 off the standard Sam.

In the same way as they did last time, West Coast require you to send your machine to them at the Abernart address so that Blue Alpha can check out the traded-in computer. Give us a ring in Gloucester if you want more details.

URGENT we need your news. Anything you think other people should know about. Each item printed earns the contributor 3 months extra subscription (please claim when next renewing).

The Editor Speaks

1994. Big year this, in more ways than one. Expansion here at **FORMAT HQ**, new services coming soon and several new products (more on these in the next few months). My big four oh. And plans for another show here in Gloucester. Such a lot going on I think I'll book that rest-cure for early summer, you know, the one with the padded cell.

Still, Happy New Year, may this one bring you health, wealth and happiness (together with 12 more issues of **FORMAT**). We hope you had a good Christmas and now have lots of doosh to spend on your computer hobby - because we have some wonderful special offers for you included with this issue - see the **NEW YEAR SALE** page for details..

As usual this issue is the smallest of the year because there is so little time to prepare it, get it printed and packed before I can let Jenny have her much deserved Christmas break (I have to give her time off or her kids will be round to duff me up - comes to something when you have to give your right hand woman time off just because its Christmas, I think old Ebenezer had the right ideas).

Anyway, if I keep on like this I will never get the issue off to the printers so lets get down to a couple of more important items.

There still seems to be a number of people who haven't got the message over Stamped Addressed Envelopes. There are a number of items on Jenny's desk waiting for SAEs before we can send them out. I'm sorry, but it is unfair on other members if we waste our resources paying to send items to people who forget an SAE.

Now a little appeal. We have now

taken over the DTP package from PCG - you will find it advertised on the **NEW YEAR SALE** page later in this issue. But one thing we have not been able to get from PCG is a copy of the +3 versions of the DTP, Fonts or Clip Art discs. If anyone has a set that they could sell or loan to us we would be very grateful and make it well worth your while.

While on the subject of the +3 there has been several letters from members wanting software on +3 disc. If anyone knows where +3 software can still be obtained then drop us a line so we can print details in **FORMAT**.

Now my deliberate mistake last month, I don't know - I always seem to drop a clanger when it comes to Wordsquare time. Thanks to the people who phoned to tell me that I had put in 70 words not 69. What I should have done was to circle one of the words in the grid leaving 69 to find - I must have been half asleep at the time. Still, if you find all the words in the list, one word extra should not cause you problems.

The change over to us processing the orders for West Coast Computers is now almost complete. Some dispatching, particularly that of machines, will still be done by Blue Alpha but most interfaces and other items will in future go out from Gloucester. Robert Browning, West Coast's customer care rep will be spending one day a week here in Gloucester for the next few months to help us establish the new system and to lend a hand until we take on some new staff.

Well, that's it for the first editorial of 1994. Until next month.

Bob Brenchley, Editor.

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SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

Let's start the New Year without messing about! P.J.Williamson of Sleaford, Lincolnshire has sent a Super SamSnippet. He has several programs that are menu driven. In these, he prefers to use the GET command rather than the INPUT command, because GET is much faster. The problem is that GET works after only one entry. Therefore the options on the menu can run only from 0 to 9 or the single letters a to z. The following little program allows one to input two or more characters with the GET command before the command is implemented on the menu selection.

```
10 LET A$="",B$=""
20 FOR X=1 TO N
30 GET A$
40 LET B$=B$+A$
50 NEXT X
60 LET A=VAL B$
```

The variable N is set at the number of characters before the menu is activated. If N=2 then every input made must have two characters; e.g. 01, 05, 10 or 18 etc., or ab, xy etc. In the case of numerical inputs, line 50 puts the string variable back to a numerical variable. If letters are used, then line 60 is not used and B\$ activates the menu selection directly.

Great stuff.

Carol Brooksbank's comments on *Style Writer* the other month have provoked one or two bits and pieces. For instance, I have a letter from a Frank Harrop of Brighton, who seems to have a different version of the program from Carol. At

any rate, one of the lines is numbered differently from the example I printed: I hope it's not a misprint. The ending of this unhappy saga is that after he has made the necessary alterations, and pressed RETURN to put the line back, the computer does a monumental reset! I've sent his disc on to Carol for examination. This is a one-off; folks: I just can't be a SAM support agency as well, and neither can Carol. So please, don't inundate me with defective discs and programs; I can't cope. But beware: it seems that there may be more than one version around.

While I am talking about Carol, I should mention that one of the most impressive dot-matrix printers I have reviewed recently has been the little 9-pin Star colour job. It gave incredibly clear output for little over £100. There's just one snag with all these printers - the cost of the ribbons. Carol to the rescue. As you know, Carol is famous for manipulating dot-matrix, and reports on the 'Maxiprint four-colour re-inker' as follows:-

"You can buy this kit from Quill Marketing or Gordon Collins, price about £15. I found that, with the Citizen Swift 9, at any rate, if you follow the instructions the result will probably be disastrous, because the hole piercing positions on the four ink cartridges do not line up with their respective stripes on the ribbon. My solution was this:-

Set up the cartridges as instructed, but

DO NOT PIERCE HOLES IN ANY OF THEM. Thread the ribbon in between them as per the instructions. Now wind the ribbon through until the diagonal join on the ribbon appears. (You need to know where you start inking, and the join is very obvious in a colour ribbon. This is less messy than marking the ribbon with Tippex). Winding the ribbon 'dry' like this will leave a four-colour striped mark on each of the ink cartridges. Pierce each one right in the middle of its colour mark on the cartridge. You will almost certainly not be near any of the prepared piercing points on any of them, so making the holes will be a little harder than usual, but it is not very difficult.

I found I controlled the whole business better by inking one colour at a time, but those braver than I would probably be able to ink the whole ribbon in one pass as per the instructions.

For the Swift 9, I had to buy another driver tip for the Maxiprint, because the one which turns black ribbons slips in the four-colour one. Quill supplied me with one intended for the the Genicom/Memorex Telex 4000 series, costing £10, which does the job perfectly."

Magic. Thanks Carol.

Now to Lee Willis for a minute or two. Lee is a smashing programmer, and the other month he included a couple of short programs with his demo (which I couldn't use, cos it was all SCREEN\$ and BLITZ, which is why there were frantic phone calls imploring him to write another demo in time for the Christmas issue). Anyway, these short programs convert files from *The Secretary* between its two line lengths. However, although I carefully typed in the text, they got omitted from the final SAMdisc that I sent to Bob, and so were not printed.

Poor Lee; frantic messages for a revamp of the one job, and callous omission of the other. Anyway, here they are now. Both programs are for MasterDos only.

```

5 REM 85>84
10 SCROLL CLEAR
20 CLOSE #4: CLOSE #5
30 OPEN #4:"Filename"IN
40 POINT#4,9: LET ADR=65536
50 DO
60 LET A$=INP$(#4,85)
70 POKE ADR,A$( TO 64)
80 LET ADR=ADR+64
90 LOOP UNTIL EOF 4
100 INPUT "Filename : ";F$
110 SAVE F$ CODE 65536,ADR-65536

```

```

5 REM 64>85
10 SCROLL CLEAR
20 CLOSE #4: CLOSE #5
30 OPEN #4:"FILENAME"IN
40 POINT#4,9: LET ADR=65536
50 DO
60 LET A$=INP$(#4,64)
70 POKE ADR,A$+STRING$(21,CHR$(32))
80 LET ADR=ADR+64
90 LOOP UNTIL EOF 4
100 INPUT "Filename : ";F$
110 SAVE F$ CODE 65536,ADR-65536

```

Many thanks, Lee.

Again, I'll press on with some SAMstuff - lots of that on my pile.

Remember the comments about SAMcolour and LINE interrupts a month or two ago? Next, then, is a SAM offering from Peter Alleston, one of our more youthful readers, of Sudbury, Suffolk, who writes with a program to put all of the colours on the screen at once 'using line palettes'. Very short and sweet...

```

10 PALETTE: CSIZE 8,8: BORDER
15: PEN 0: PAPER 15: CLS:
LET PAL=0
20 FOR X=176 TO 48 STEP -1
30 LET PAL=PAL+1
40 PALETTE 15, PAL LINE X
50 NEXT X
60 PRINT AT 19,0;"All the palette colours are on "; TAB 10;"the screen."

```

...and quite neat. Many thanks, Peter.

Roy Gardner of Leytonstone, London, also writes about LINE interrupts; this time about John Saunders' interest in LINE interrupts in the October '93 issue of *FORMAT*. "Put simply," Roy says, "For those who know less than I, here's a simple explanation of LINE interrupts."

The lines in question are those used by the computer to display the picture. They are numbered from 172 to -18 from top to bottom of the monitor: 172n is the top of the display, not the top of the monitor screen. When SAM displays a screen he starts at line 172 unless you tell him any different, as in the screen display program which follows. After line 172 is complete, an INTERRUPT occurs. This means that SAM stops for just a fraction of a second to check if the next line should be displayed with the parameters unchanged. If so, he carries on with line 171 and checks again. This INTERRUPT at the completion of each line allows us to change certain things, such as palette colours. Other things can be done as well, but let's stick with the simple bits for now. As I mentioned, the lines are numbered from the top; 172 to 0 and then -0 to -18 for the bottom two lines. This then adds up to 192, the number of lines.

It becomes clear that if we say palette n, colour x, line y then SAM will allocate the selected colour to the line number y when he gets there. The colour will extend the full width of the screen. All palettes can have their colours changed at any line, but too many changes will result in an error message. It is by this means that all 256 colours can be displayed at once. Palette changes can be put in loops to get a colour scroll effect. The program 'Line' has a simple display which can be improved and used on your

own SAM. Here it is...

```

2 REM LINE Roy Gardner 10:93
10 PALETTE : FOR f=0 TO 2: PALETTE f,16: NEXT f
15 BORDER 0: PAPER 0: CSIZE 16,16: CLS : PRINT AT 3,3:
20 PRINT PEN 1;"P "; PEN 2;"O "; PEN 1;"R "; PEN 2;"M "; PEN 1;"A "; PEN 2;"T"
30 PAUSE 50: FOR f=1 TO 16: LET a=RND(35)+90,b=RND(35)+90,b=94: FOR g=70 TO 82
35 PALETTE 1,a LINE g: PALETTE 2,b LINE g: PALETTE 0,a-50 LINE h: PALETTE 0,16 LINE 54: PAUSE 2: LET h=h-3
47 NEXT g: NEXT f
50 PALETTE : CSIZE 8,9

```

The program 'Scrdis' does not use interrupts when displaying your favourite SCREEN\$, but does show a little of the possibilities of using line numbers to change the way SAM displays screen. Using palette changes while displaying a screen in this way can be er colourful, too. Try it!

```

100 REM SCRDIS by Roy Gardner
105 DIR 1: INPUT "Filename to LOAD? ";A$: LOAD A$ CODE 114688
110 REM from centre
112 LET A=520192: REM 258176 for 256K
114 LET G=0: FOR F=1 TO 97
116 POKE A-G,MEM$(126976-G TO 127103-G)
117 POKE A+128+G,MEM$(127104+G TO 127231+G)
118 LET G=G+128: NEXT F
119 PAUSE 100: CLS
131 REM two centres
132 LET A=514048: REM LET A=251904 for 256K
133 LET G=0: FOR F=1 TO 49
134 POKE A-G,MEM$(120832-G TO 120960-G)
135 POKE A+127+G,MEM$(120959+G TO 121086+G)
136 POKE A+12286-G,MEM$(133118-G TO 133245-G)
137 POKE A+12413+G,MEM$(133245+G TO 133372+G)
138 LET G=G+128: NEXT F: PAUSE

```

Many thanks, Roy.

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Finally, there's a comment from Ray Bray on the subject.

A line interrupt can be initiated at the end of any video scan-line. It's controlled by the Line Interrupt Register (output port 249 Dec), and the Line Interrupt Colour Table at address 22016. The Line Interrupt Register can contain a scan-line number from 0 to 191 (numbered from the top of the screen), or is inhibited by entering a false number from 192 to 255. When it contains a valid scan-line number, an interrupt occurs at the end of the scan-line before the one matching its contents.

The Line Interrupt Colour Table holds data on the required changes of palette at nominated lines. The data are held as four bytes for each entry in the order: scan line number; palette number; colour number; colour number. If the second colour is different from the first, the colours will alternate at 3 times a second. A total of 127 entries can be held and the last entry is followed by a 255 byte. I am not sure how this table is scanned, but it appears that it resets the Line Interrupt Register with the next line number to be acted on.

The other vital element in the operation of interrupts is the interrupt STATUS register (input port 249 dec), which indicates which of the five possible interrupts is operating. In the case which concerns us, it is Bit 0 of the status register which indicates whether the Line Interrupt is requesting. This bit is normally high, but goes low when an interrupt is requested.

To use the Line Interrupt Register, it was originally intended to incorporate a Line Interrupt Vector, which would have made the use of this interrupt no more complicated than the Frame Interrupt Vector. Although this vector is listed and

described in the Technical Manual, and exists as an address in the SAM ROM, it was never implemented in the final ROM. However, the Any Interrupt Vector can be used instead, as this makes the use of line interrupts only slightly more complicated.

ANYIV jumps to the vector address on receipt of any interrupt. Therefore the STATUS register has to be read to confirm if the line interrupt has been requested. The shell to hold the machine code routine is therefore as follows:-

```

Enter: BIT 0,C ;Bit goes low on
      Line Interrupt requests.
      JP NZ,73 ; Jump back to
      ROM interrupt handler (0049hex)
      PUSH BC
      PUSH DE
      PUSH HL
. . . Your Code Here . . .
      POP HL
      POP DE
      POP BC
      JP 73 ; Return via ROM

```

To call a machine code routine with the line interrupt, use the following steps:-

1. Load the machine code routine, enclosed in the shell above. Remember, it will be called from ROM, so the address must be accessible to ROM.
2. Set the interrupt register. This is done by executing a dummy PALETTE c,c LINE n command, in which a palette is set to its existing colour and a line is nominated for the interrupt.
3. DPOKE ANYIV with the start address of the code.

Points to note:-

- a. The line interrupt needs the data in the Line Interrupt Colour Table to operate: you can't merely put the line number in the Interrupt Register with an OUT 249 command. However, the interrupt will work if you just POKE the appropriate values into the table and do nothing with the register. As Ray

mentioned earlier, he doesn't know what the precise relationship is between these.

b. Although the manual says that the 16 bit registers are stacked before the ANYIV vector is acted on, and implies that a JP 73 is an acceptable exit from your code, he has found that unless the patched subroutine preserves these registers, the machine will crash.

c. If the patched routine is too long, it will slow down any changes to the display.

d. Once initiated, the patched routine will operate every time the nominated scan line is reached. To inhibit this, you can do a DPOKE 23408,73, or, alternatively, load 73,0 to this address before leaving machine code.

Ray hopes this might answer some questions, and even lead to some clever ideas for making use of this capability. Finally, he mentions that he acknowledges Andy Wright's help on pointing him in the right direction on this subject. Many thanks, Ray.

Now, I'm again short of Spectrum stuff, but here's a couple of tips. Firstly, there are still some Spectrum +3's lurking around in warehouses. And they're very cheap. How do you know if they're any good? Find a mate with 'Tasword +3', and load it in (it uses pretty well every last memory location). If it goes in without crashing, and if it will LOAD a text sample from your helpful mate and save it onto a spare disc, and if you can type a sample sentence like 'The quick Brown Fox' and do be careful to check cap M, cap N and particularly the cursor keys which often come up unshifted, then it's likely to be OK. A very usual problem is a dodgy drive, so try also a couple of games (my, he is helpful). And that will confirm it.

Brian Gaff, who advertises in most

issues, will help if you want to add a second 3.5" drive, as 3" discs are not very common and getting very expensive. You can still pick them up at the shows, though. Sometimes already duplicated for the Tatung Einstein (R.I.P.); more often for the Amstrad 6128 or the Sugar Word Processor with that beastly dot matrix printer. Whack 'em into the 3" drive when you get home, and you'll find you can't format them. When Mr. Sugar's merry men wrote the +3's DOS (well; modified CP/M to fit), there were all sorts of raw edges, and you'll find that the +3 gets its knickers into the following sort of twist or loop...

```
(You) FORMAT A: (you brute)
(Speccy) Error: Don't recognise Format
(You) FORMAT A: (you brute)
(Speccy) Error: Don't recognise Format
(You) FORMAT A: (you brute)
(Speccy) Error: Don't recognise Format
And so on...
```

Take one of your precious discs with information on. (Or your mate's even better). Stuff it in. Now Enter...

```
(You) FORMAT A: (you brute)
And the thing will respond
(Speccy) Disc already formatted. D'you
STILL want me to format it? (or words to
that effect).
```

Withdraw your cherished disc intact. Stuff in the one it would have nothing to do with and type Y, or whatever it wants. And off it goes. Oh, er, and if it's a precious disc you were using (well, if the information was precious), it's worth write protecting. Just in case.

That's all for now, folks. Please send your snippets to me:- John Wase, Green Leys Cottage, Bishampton, Pershore, Worcs, WR10 2LX.

I particularly need more Spectrum material so come on readers - send some in please. See you next month.

The Secretary

DIY WAYS TO REDEFINE THE KEYBOARD

By:- Etrick Thomson.

One of the useful features of the SAM word-processor, *THE SECRETARY*, is that of redefining the keyboard, with a choice of characters from the normal Set and from IBM Character Set #2. But unfortunately you can't do everything you might want.

In the keyboard as defined by the master copy, the key [SYMB] F does not give, as the normal SAM does, an opening curly bracket, "[", but some foreign symbol; I wanted to restore the bracket, but found that it couldn't be done by *THE SECRETARY*'s facilities. This led to the discovery of various possibilities, some of them given below. Many of the investigations were carried out jointly by Carol Brooksbank and myself.

The keyboard is primarily defined by the file "Key_Dkeys", with 281 bytes, numbered, say, 0-280; then bytes 1-280 correspond to the 280 map-positions of the SAM keyboard, each holding what I shall call a 'k-code'; most of the k-codes are codes of printable characters, but some are control codes, including zero, the NUL control code. To restore the curly bracket, whose ASCII code is 123, to key [SYMB]F, whose map-position is 128:-

```
LOAD "Key_Dkeys"CODE
POKE 22752+128,123
SAVE "Key_Dkeys"CODE
22752,281
```

More about the 210 k-codes for printable characters. In IBM Character Set #2 there are two separate codes for #

(CHR\$ 35) and £ (CHR\$ 156) so there is none of the trouble that often arises with these two. But, to get # from 35 means that the US International Character Set must be in force. With my printer, a Star LC-10II, the power-up set is the UK one, in which 35 produces £, so I had to alter the printer control code in *THE SECRETARY* that sets up IBM #2; this is number 32 in the list, each occupying 16 bytes, so:-

```
LOAD "prcodes"CODE
POKE 106200+16*32,27,116,49,27
,54,27,82,0
SAVE "prcodes"CODE 106200,576
```

The k-codes 32-168 are also the IBM character codes, but those from 169-241 represent a selection from IBM codes 169-254, and a translation table (in bytes 52-124 of file "prn") is used to specify which. The k-codes can be deduced from the character-diagram that is displayed by the EDIT menu GRA(phics)/G(raphic Chr), which has 6 rows and 19 columns; if the rows are numbered 128,147,166, 185,204,223 and the columns 0-18, then add row number to column number to get the k-code for a given character.

Suppose we want to use one of the 13 IBM characters omitted by *THE SECRETARY*, say the division-symbol like a minus sign with a dot above and below (+), IBM Code 246. We have to give up one of those provided in the k-code range 169-241, say the upside-down exclamation mark (!) unless we want to write Spanish, k-code 235,

which "Key_Dkeys" assigns to [SYMB]minus; we can accept this allocation, or alter "Key_Dkeys" to assign k-code 235 to another map-position. To alter the translation table, so that the byte for k-code 235 contains IBM Code 246

```
LOAD "prn"CODE
POKE 105882+235,246
SAVE "prn"CODE 106000,145
```

Pressing the key assigned to k-code 235 will now send Code 246 when the text is printed - but the screen will still display "i"; to make a proper job of it, we have to alter "Sec_chr2", the character set for k-codes 169-241 (and also for k-codes 242-255, which provide the screen characters indicating e.g. that Italics has been selected). As usual, we have to provide 8 numbers specifying the 8 rows of a 8*8 grid. For the example:-

```
LOAD "Sec_chr2"CODE
POKE 38648+8*235,0,0,8,0,62,0
      ,8,0
SAVE "Sec_chr2"CODE 40000,712
```

In fitting the character into the 8*8 grid, note that SAM (unlike Spectrum) leaves columns 1,2,8 empty, so that CSIZE 6,8 (used in *THE SECRETARY* if 85 columns is specified) still looks reasonable.

Another way of providing one's own characters is to build them up from those available. Example: the mathematical symbol for 'not equals'; this is not the "≠" used in Basic, but an equals sign crossed out (≠), and can be produced by sending to the printer "≠";CHR\$ 8;"", where CHR\$ 8 is the backspace code. The printer control codes of *THE SECRETARY* allow the sending of several characters; suppose we decide that the one for the printer font 'Orator Lower Case' (number 17) can be dispensed with; then:-

```
LOAD "prcodes"CODE
POKE 106200+16*17,61,8,47
SAVE "prcodes"CODE 106200,576
```

will alter it so as to emit the required characters. Selecting a printer font is normally done from the EDIT menu CHR; but these fonts have k-codes: Courier, 251; Sanserif, 252; Orator Caps, 253; Orator LC, 254; and so can be assigned to a chosen key (just as 'Bold', 'Italics', etc are) by altering "Key_Dkeys". Again, "Sec_chr2" must be altered so that k-code 254 produces a picture of the built-up character; the 8 bytes needed are 2,4,62,8,62,16,32,0.

Lastly, ASCII code 96, which is ignored by Spectrum and SAM, in which CHR\$ 96 is the pound sign. You can assign k-code 96 to a key, and can thus send it to the printer; with my Star LC-10II, the result depends on the font: with Sanserif, an opening single quote results - a raised comma like that produced on the SAM screen by [CAPS]7, but with the tail pointing in the opposite direction; the other fonts give something like a French grave accent. If you assign k-code 96 to a key, the screen will display SAM CHR\$ 96, a pound sign; this can be changed by altering the SAM character set, which, unlike Spectrum, is in RAM. A convenient way is to alter the Basic of "Auto_Sec"

```
LOAD "Auto_Sec" LINE 65432
      (Line 65432 "doesn't exist")
```

Then add a line

```
65 POKE DPEEK SVAR 566+8*96,24
      ,16,8,0,0,0,0,0
```

then

```
SAVE "Auto_Sec" LINE 10
```

This will give a screen character that is the reverse of that produced by [CAPS]7.

These various suggestions should help users of *THE SECRETARY* to make it even more useful.

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The Fractal Collection

Reviewed By:- Carol Brooksbank.

Those of you with a mathematical brain will already know what fractals are. For the rest of us, they are complicated equations, often involving imaginary, or speculative numbers, as well as real ones, or known values. They are often used by people who need to forecast things or try to work out patterns of recurrence - people like statisticians, astronomers, those who study population growth or those who try to discover meaningful patterns in weather and climate behaviour.

If these same equations are applied to the plotting of the colour of points on a computer screen, amazing patterns appear. Those who love numbers will be fascinated by this visual display of very complex calculations. For me, the fascination lies in the beauty of the images. I don't begin to understand what goes on mathematically. If you want to know more about how they work, look in your **FORMAT** back numbers. Way back in Vol. 2, no.9 (May 1989) there was an article on Mandelbrot Pictures by Ray Williams, which triggered off my interest in them.

S.D. Software's new **FRACTAL COLLECTION** contains 18 different fractals, all producing different types of image. For the mathematicians, the handbook contains information about each equation, not only what it is, but how it came to be developed.

The patterns drawn on screen use shading to simulate colour. The visible

area on screen is only a window onto a much larger fractal map, and by changing the co-ordinates you can see a different area. You can also zoom in and enlarge small sections of the map, and repeat the zooming over and over again, going deeper and deeper into the picture and finding incredible patterns in what was only one pixel, or even invisible, on your original screen.

My particular favourite is the Julia set, and both illustrations show that. If you keep the zoom box, as I have in Fig.1, on a line dividing the picture in half lengthwise, the Julia set images remain symmetrical. Fig.1 shows the original image, and five successive enlargements. The square box on each image shows the area blown up on the next. When you look at the area enclosed on the first image, it looks most unpromising - a jumble of dots and areas of white space. But enlarge it, and you see all the shapes in Image 2. The small leaf-like shape in the almost circular space in Image 6 is only one pixel in Image 4, and far too small to be visible in the earlier ones. All these exquisite shapes are there, deep in the rather uninspiring Image 1.

Often, certain shapes reappear over and over again at every degree of enlargement. Fig.2, Image 1, shows a vaguely kidney-shaped object, with two smaller kidney shapes within it, one at each end, and within each of those are two more. Every time you zoom in on one of the shapes and enlarge it, the same

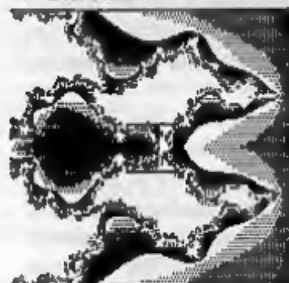
Fig.1 - Images 1 to 3.

X= -2.000000 Y= -2.000000
Width= 4.000000 Height= 4.000000
30 iterations

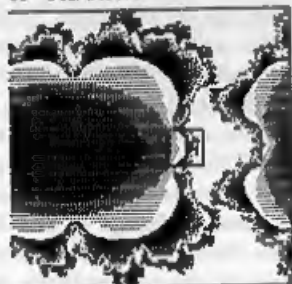


Map 1, Image 1. The square encloses the area enlarged

X= 1.144027 Y= -0.253069
Width= 0.524137 Height= 0.524130
30 iterations



X= 1.351712 Y= -0.045185
Width= 0.090360 Height= 0.090369
30 iterations

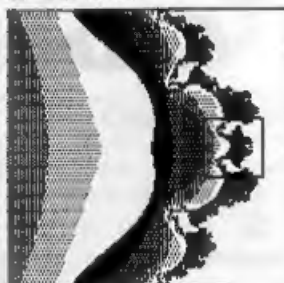


pattern is revealed. With a high-power computer you could presumably keep this up for ever, but the Spectrum boggled at the mathematics after image 4, and dumped me into Basic with an 'overflow' message.

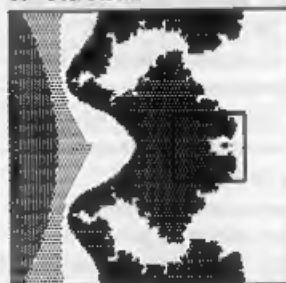
The program lets you change the fractal, the parameters used, the co-ordinates, the size of the viewing

Fig.1 - Images 4 to 6

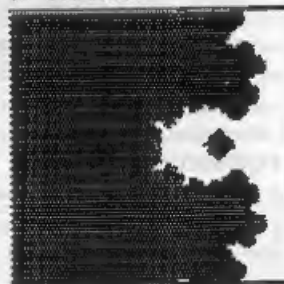
X= 1.412193 Y= -0.065921
Width= 0.011042 Height= 0.011541
30 iterations



X= 1.429523 Y= -0.061266
Width= 0.002532 Height= 0.002532
30 iterations



X= 1.422097 Y= -0.000323
Width= 0.000546 Height= 0.000546
30 iterations



window, the maximum number of iterations (the number of times the equation is allowed to loop while calculating the colour of a dot), the type of algorithm used (one which guesses at some of the colours to speed things up, or two others which produce a more accurate image, but much more slowly), the number of colour bands which are

Fig. 2 - Images 1 to 4.

X= -2.000000 Y= -2.000000
Width= 4.000000 Height= 4.000000
30 iterations



Map 2, Image 1.

X= 0.474197 Y= 1.034063
Width= 0.100542 Height= 0.065636
30 iterations



Image 3.

X= 0.124138 Y= 0.951724
Width= 0.634402 Height= 0.634402
30 iterations

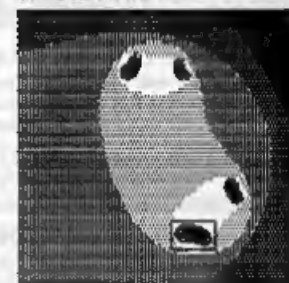


Image 2.

X= 0.404600 Y= 1.075160
Width= 0.020120 Height= 0.013127
30 iterations

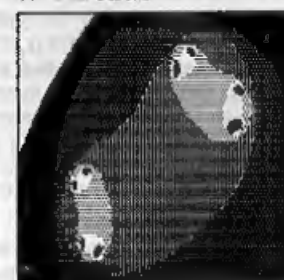


Image 4.

invisible to you, the number of shades used and so on. I found that setting the iterations at 30 and the invisible contours at 15 struck a decent balance between zoom pictures with interesting detail, and an image which appeared in a reasonable time. Some settings take a very long time to produce anything. With those, you go away and do something else while the image appears if you are wise. It is very easy to lose patience and interrupt the operation to try a different fractal, but many of the images are well worth waiting for.

It is a pity that the Spectrum's colour attribute clash makes it impossible to use colour with the program - the shading shows how spectacular the

images would be in colour. I have seen one or two Sam screens of Mandelbrot maps in full colour, and they are very beautiful indeed.

If you apply the equations to sound frequencies, the result is an eerie sort of electronic music. *THE FRACTAL COLLECTION* lets you do that too. You can change the frequency to get different effects, and the relationship between the image being built up on screen and the sound being played is obvious. The music is more interesting when the image being drawn is full of shade changes and has few large areas of one colour. The music can be more varied if you specify a greater number of shades to be shown,

Turn to page 24.

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BASICally Speaking...

Part 3.

By:- David Finch.

This month I want to start looking at 'Logic and Conditions'. Now I know Logic has been covered in *FORMAT* several times in the past but I'm afraid I have to go over it again because Conditions depend on Logic.

Some of the concepts that I am about to introduce are often difficult to understand at first, so be prepared to reread this section a few times before you fully understand.

A feature of computers is the ability to make decisions. A word processor can decide when to start a new line. A game can decide when the game is over. You can instruct your computer to make decisions in Basic, and once again the language used is similar to English.

These conditions are based on logic: *true or false, yes or no*. If the conditions are right then the computer does something.

Imagine your computer is connected to an air conditioning system in an office. In English you would say:-

```
IF it is cold  
THEN switch on the heater
```

so in Basic you would write

```
IF COLD THEN (HEATER_ON)
```

(HEATER_ON) is the command to switch on the heater. It doesn't exist in Basic because your computer isn't connected to a heater.

We have another problem, how does the computer know if it is cold? Imagine we have a temperature sensor which

uses the variable TEMPERATURE in Basic. (*Variable*: letter or word that can represent any number, like in algebra) We could say:-

```
Cold is when the temperature  
is less than  
18 degrees centigrade.
```

Or in Basic:

```
LET COLD = (TEMPERATURE < 18)
```

Note that I have used the sign <. This means LESS THAN. The opposite sign is > and means GREATER THAN. If you can't remember which way round they are, imagine it is a crocodile's mouth. The crocodile is greedy and always wants to eat the larger side.

For example $1 < 2$ means one is less than two. $2 > 1$ means two is greater than one.

So if the temperature is 16 degrees, the computer decides that 16 is less than 18, so it is cold. If the temperature is 19 degrees then the computer decides that it is NOT cold.

If you are confused, don't worry. Type in this program and it may become clearer.

```
10 PRINT "This computer does not  
have a temperature sensor.  
Please type in the temperature  
below."  
20 INPUT temperature  
30 LET cold = temperature < 18  
40 IF cold THEN PRINT "Switch  
the heater on"
```

RUN this program a few times and enter a few numbers. Notice that it doesn't

switch the heater on when the temperature is 18. This is because eighteen isn't less than eighteen.

Now add the next line to your program.

```
50 IF NOT cold THEN PRINT "Switch the heater off"
```

Now, if the temperature is not less than eighteen (19 for example), then instead of printing nothing, it tells you to switch the heater off

SAM USERS ONLY. Read the following. You can avoid having to type two lines with the ELSE command. It works the same as in English:

```
IF (something is true)
  THEN (do this)
  ELSE (do that)
```

IF it is raining THEN take your umbrella, ELSE take your sunglasses.

NB. In SAM Basic you have to use a colon : to separate the first instruction and the ELSE

Remove line 50 from your program (type 50 then RETURN), and edit line 40 to the following (type 40 then press edit)

```
40 IF cold THEN PRINT "Switch the heater on": ELSE PRINT "Switch the heater off"
```

If this confuses you then use the other method

EVERYONE read the following.

Try and add to the program to tell you to switch the fan on or off when it is above or below 25. Don't cheat and look at my solution, and don't worry if you get it wrong (you learn from mistakes).

HINT: Your first line might be:-

```
60 LET hot=temperature>25
```

Next month we will continue to explore this area of programming.

See you then.

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Uni-Dos Corner

By:- Henk van Leeuwen. Edited by:- Adrian Russell.

As users of UNI-DOS will know CREATE files are used to add new commands and functions which can be used in your own BASIC programs. The CREATE files, when loaded, are stored in the BASIC memory space and they must be written to be relocateable.

This month's CREATE file will print the memory left and memory available on screen, the command for it is:-

```
READ *
```

First, the source code for an assembler, by far the best way to enter machine code.

```
ORG 60000
START  DEFB 1 ;only one syntax
       DEFB 227 ;ASCII code for
       READ token
L_READ DEFW readlen
       CP "@" ;code 64
       RET NZ ;reject if wrong
       RST 40 ;point to the end
       of syntax
       RST 24
       DEFB 13 ;SYN.END
REF    RST 24
       DEFB 108 ;relocats
       DEFW REF
       DEFB R1+1-REF
       DEFB R2-R1
       DEFB R3-R2
       DEFB R4-R3
       DEFB R5-R4
       DEFB 0
R1     CALL CLS ;clear screen
R2     CALL FREE ;print memory
       free
       RST 24
       DEFB 99 ;go to the next
       line
R3     CALL USED ;print mem used
       RST 24
       DEFB 14 ;COM.END
CLS    RST 16 ;clear screen in
```

```
DEFW 3435 ;spectrum ROM
RET
FREE   RST 24 ;point print chan
       to #2
R4     DEFB 100 ;PR.SCR
       LD HL,TEXTA ;print text
       RST 24
       DEFB 90 ;PR.MESS
       LD HL,0 ;make HL zero
       ADD HL,SP ;Calc Free RAM
       LD DE,(23653) ;load DE w
       ith start free RAM
       AND A
       SBC HL,DE ;subtract DE
       RST 24 ;print value
       DEFB 91 ;PR.NUM1
       RET
USED   RST 24
       DEFB 100
R5     LD HL,TEXTB ;load addr
       of text
       RST 24
       DEFB 90 ;PR.MESS
       LD HL,(23627) ;HL=VARS
       LD DE,(23635) ;DE=PROG
       AND A SBC HL,DE
       RST 24 ;print value
       DEFB 91 ;PR.NUM1
       RET
TEXTA  DEFW "MEMORY FREE ="
       DEFB " "+128
TEXTB  DEFW "MEMORY USED ="
       DEFB " "+128
READLEN EQU $-L_READ
As we did last month, here are the Basic DATA statements for you to use if you do not have an assembler available. Just write a small code paker to go with them.
20 DATA 1,227,102,0,254,64,192,239
21 DATA 223,13,223,108,106,234,11,3
22 DATA 5,11,21,0,205,129,234,205
```

- 23 DATA 133,234,223,89,205,154,234,223
- 24 DATA 14,215,107,13,201,223,100,33
- 25 DATA 174,234,223,90,33,0,0,57
- 26 DATA 237,91,101,92,167,237,82,223
- 27 DATA 91,201,223,100,33,188,234,223
- 28 DATA 90,42,75,92,237,91,83,92
- 29 DATA 167,237,82,223,91,201,77,69
- 30 DATA 77,79,82,89,32,70,82,59
- 31 DATA 69,32,61,160,77,69,77,79
- 32 DATA 82,89,32,85,83,69,68,32
- 33 DATA 61,160

Continued from page 19.

but I thought the images more attractive if you stick to the five shades which are the default when it loads.

The program is for any Spectrum with DISCIPLE/PLUS D and runs in 48K mode. For Sam users the disc has a file ready for loading into S.D. Software's SPECMAKER emulator. The program runs a good deal faster on Sam, but more than once I have had it going on both machines at once, each working on a different fractal.

This is an interesting package. I have spent hours with it since I got hold of it, just enjoying the beauty of the shapes and the strange ethereal music. O.K., so it doesn't do anything, but neither do a Picasso painting or a Beethoven symphony, and £4.95 to INDUG members (£5.95 to others) is not a lot to pay for something which is both interesting and beautiful, and will give you a great deal of pleasure.

Then save it as:-

SAVE d*"READ_code" USR 60000,98

So that completes another CREATE file, We hope you find it useful. Next month, all being well, we will return with a routine that will let you save part of a Basic program - even just one line.

See you soon.



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3D CONSTRUCTION KIT EXPANDED

By:- Alan Price.

Hello, this article is all about getting more from your 128k 3D Construction Kit. First of all before we go any further I would just like to make a point about software piracy. This article is designed to enable you to use 3DCK much better, not for you to pass on pirated copies illegally for others.

Now I don't know about you but one thing that irritated me about 128K 3DCK was the test screen mode. Namely the fact that you were confined to just having "BORDER1" as your test screen. On the tutorial video it shows how the border can be loaded in on computer's such as the Amiga. But on the Speccy I thought it was not possible.

Anyway, one day I thought that I would try to make a PLUS D working copy. I found that unlike some commercial software I could do a tape catalogue of the files contained on the distribution tape. They are as follows:-

- *3DK 128K " BASIC LINE 0
- " " CODE 24576,256
- " " CODE 24576,6912 **
- " " CODE 24576,27648
- " " CODE 24576,16384
- " " CODE 24576,6912 **
- " " CODE 24576,4096

When I looked at the list I noticed that there were two files which looked like they could be Screen\$. These are the two files that I have highlighted. The first is the 3DCK's loading screen. It's the second file that turns out to be the test screen border. The following programs

were written to make a tape based 3DCK with a test screen border of my own.

Listing 1.

- 10 CLS : PRINT AT 2,0;"128K 3D CONSTRUCTION KIT SAVER"
- 20 PRINT AT 4,0;"PLEASE ENSURE THAT NO COPYRIGHT INFRINGEMENT TAKES PLACE"
- 30 PRINT AT 6,0;"Make sure that the test screen border you wish to use is on this disc"
- 40 PRINT AT 21,3;"Press any key when ready"; PAUSE 0: CLS
- 50 PRINT AT 21,3;"Insert tape & press record"; PAUSE 100
- 60 LOAD D1"3DK 128K"
- 9999 SAVE D1"3DCK SAVE" LINE 10

Listing 2.

- 10 CLEAR 24063: LOAD "" CODE 24064 : RANDOMIZE USR 24064
- 20 SAVE "3dk 128k" LINE 10: LOAD D1"3DCK SAVE1"

Listing 3.

- 10 INPUT "BORDER FILENAME:";a\$: CLS
- 20 LOAD D1"1" CODE : SAVE ". " CODE 24576,256
- 30 LOAD D1"2" CODE : SAVE ". " CODE 24576,6912
- 40 LOAD D1"3" CODE : SAVE ". " CODE 24576,27648
- 50 LOAD D1"4" CODE : SAVE ". " CODE 24576,16384
- 60 LOAD D1;a\$ CODE 24576: SAVE ". " CODE 24576,6912
- 70 LOAD D1"6" CODE : SAVE ". " CODE 24576,4096
- ## BY##
- 9999 SAVE D1"3DCK SAVE1" LINE 10

Ideally you should use one disc for this purpose and you should only use these programs AND information contained in this article for your own use.

When finished your disc catalogue should look something like the one at the top of the next column.

And finally, these programs were written specifically for the PLUS D system, but I'm sure that with a few alterations these programs could be tailored for any system. Also these programs cannot be used with the 48K

MGT PLUS D DISC 1 CATALOGUE			
1	+SYS 2a	14	CDE 8192,6656
2	3DCK SAVE	1	BAS 10
3	3DK 128K	1	BAS 20
4	3DCK SAVE1	1	BAS 10
5	1	1	CDE 24576,256
6	2	14	CDE 24576,6912
7	3	55	CDE 24576,27648
8	4	33	CDE 24576,16384
9	6	9	CDE 24576,4096
10	BORDER1	14	CDE 32768,6912
11	BORDER2	14	CDE 32768,6912

Number of free K-Bytes = 722

version of 3D CONSTRUCTION KIT as that doesn't have a test screen border facility due to memory limitations.

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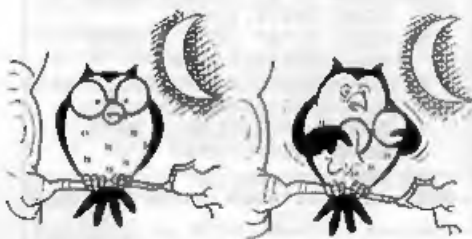
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YOUR LETTERS

Dear Editor,

Last month you had to carry the can for mistakes in *Machine Code Without The Tears*. Well this month it is my turn. Rushing to get Part 23 done (many months ago this was) I typed in the Basic part of the program instead of using a routine to convert Basic into a text file.

So, I'm sorry to say, a few minor mistakes crept in - but even minor mistakes stop programs working. Here then are the lines to alter.

```
190 RANDOMIZE USR KEYC (and not
    hing else)
220 GOTO 190 (not 90)
330 LET ADDR=MULTW+K: POKE ADDR
    , CODE 2$(K+1)
```

I hope everyone following the series did not become too frustrated.

Yours sincerely, Carol Brooksbank.

Dear Editor,

I have been reading of the wonders of CDROM. I am writing to ask you if this is compatible with SAM and if so, does it work with either or both a television set and a monitor?

Yours sincerely, L.W.Simpson.

CD ROM drives require an interface to work with a computer and as yet there is not one available for SAM. Now that the CD ROM format is moving towards a set of common standards, the CD's themselves are becoming less machine dependant so it may be worth some hardware expert putting together an

interface in the next few years.

However, I think we are all agreed that a hard drive should come first. *Ed.*

Dear Editor,

I received the November 1993 issue of *FORMAT* this morning, and I am writing with a couple of things relevant to matters raised in the issue:-

1. The problem with a Spectrum +2 and Tasword 2, mentioned on page 23, can be circumvented by either (i) putting the Spectrum into 48k Basic before loading TW2 or (ii) by typing SPECTRUM before loading TW2 This allows the use of the SYMBOL SHIFT & A combination to call up the main menu.

2. In answer to your question regarding the distribution of the last issue of YS. I can tell you that it was available in this part of Sussex. I have to add, however, that I was able to get hold of a copy because I reserved a copy with my newsagent. I'm sure you'll agree that this is a much easier way of receiving a magazine than travelling to W.H.Smiths every day on the off chance that the magazine on the shelves?

Finally, can I take it that you have shelved plans for your games-orientated title, given that I have not had a reply to my query regarding it since I first asked back in July?

Yours sincerely, Jon Rose.

Thanks for both bits of info Jon. And no, the games mag is not shelved - just waiting to find a suitable editor. There

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has been lots of interest in a games mag, and several people have written offering to write for it, but that special type of man (or woman) that could act as editor is proving difficult to find. *Ed.*

Dear Editor,

This is being prepared using *The Secretary* and please note the '1' top right.

May I refer you to the letter from Mr J.Hunter in Vol 6, No 7, March 1993, where you advised him to try altering the Printer Reset Code or altering lines 6991 and 6998. I too have a Brother 1109 and have tried your suggestions without success. The '1' is still there!!

If Mr Hunter could please contact me and let me know if he had been successful, or anyone else including yourself Bob, if they can help to get rid of the 'dreaded' I would be most grateful. My Telephone is 0888 712753.

May I take up one further topic, and that concerns the 'CAMPION' Spreadsheet. I have already written to Revelation Software, who may well be answering my letter, but I see no reason why the problem should not be aired in your magazine. In GM Calc spreadsheet, it is possible to have a column with a list of names alphabetically, and another column with scores adjacent to each name. GM Calc can sort the figure column in ascending or descending order, thus the tow columns in say ascending order of scores rather than listed alphabetically. CAMPION is so superior to GM Calc in many respects, I would have thought it would be possible to do this numerical sort. Can someone tell me how it is done or to alter CAMPION in order to accomplish this task, please.

Yours sincerely, Dr E.J.Wilson.

There has been several bits in the Help

Page recently about *The Secretary* which may help solve your problem Dr Wilson.

As to sorting in *CAMPION*, I don't think that is possible, but there again I'm not sure if you can on any other spreadsheet either. That sounds more like a job for a database program to me. *Ed.*

Dear Editor,

Before I ask some questions which I would like to be answered, I would like to thank you for such a good magazine, keep up the good work!!

The first thing I would like to discuss is UniDOS V2, I would like someone to clear these doubts before I buy it. 1. Will I still be able to use my existing discs with it? 2. I have a lot of programs which use the microdrive and PLUS D hook codes, so will these remain the same?

MS-DOS to PLUS D Transfer - is there such a program to do this? Or does anyone know how MS-DOS works out the physical track/sector from the cluster? Manual for Sam - I have a Sam Coupé 256K, with no disc drives or manual, I would like a manual for it (must be cheap).

By the way, to stop disc corruption on the Plus D, enter CLOSE ** before any SAVE command, or before loading anything you might snapshot.

Yours sincerely, R.Patterson.

UniDOS is almost 100% compatible and has now become the standard DOS for most DISCIPLE and PLUS D owners. Existing discs work as the disc format is the same, but formatting fresh discs and copying your files over will unlock some of the extra benefits of UniDOS.

There are two MS-DOS disc readers available for SAM but I can't trace one for the Spectrum - anyone Help?

Copies of the SAM User Guide can be

obtained from West Coast Computers (via us now) for £5 including UK postage. The SAM technical manual is also available from us - see the Format Readers Service page. *Ed.*

Dear Editor,

My name is Prince, and I am Brian Gaff's (of BG Services) dog. I am writing this letter in the hope that your readers can make my life a little easier.

Picture the scene. I am trying to have a nice sleep, and all of a sudden I get woken up by a scream like 'OH NO, NOT YOU AGAIN!' or perhaps, 'DO THEY THINK I AM MADE OF MONEY' and that nice Collie from down the road vanishes from my dreams!

After some research, I think I see what the main problems are, so I thought if I made them public, these rude awakenings could be avoided, and I could get on with my busy life. I mean, its a dogs life you know!

1) *The Unreadable Letter.* It appears that some customers send in hand scribbled orders, or typed ones that are so faint that one wonders if a ribbon was used at all!

Brian, you see, is a registered Blind person, and has to use this huge TV thingy to read his mail, of course if only he could understand DOGese, there would be no problem, but you have to realise that Humans are a much lower form of life....

2) *The NO SAE Syndrome.* It seems, that you humans have to pay to send messages to each other, and Brian feels that anyone asking for advice should at least pay the return costs by sending what he calls a Stamped Addressed Envelope with their enquiry.

He was mumbling this morning about getting letters from foreign parts without

any money to cover the cost of answering them. It really makes me wonder why he bothers, if it upsets him so. After all, we dogs never have to go far to find the advice we need... which reminds me of the collie down the road.

Anyway, I have important things to do, so I hope you can help me have a better quality of life, by for now....

WOOF WOOF!

OK Prince, as you see I got your fax, although the paw prints show you had difficulty in getting the paper in.

Still, seriously now folks. This is a problem that we also suffer from and I have good eyesight (Jenny's is failing fast but that's cos I won't give her time off to get her eyes tested). Each week we get at least one letter that is so hard to read you need to be a handwriting expert just to know it is really handwriting.

So come on, play fair. Write clearly, make sure your name and address is printed at the top of the page, if you type your letter then make sure the ribbon is reasonable, and above all make sure you use a reasonable size of paper - A5 or A4 is best because it makes it easy to file. But, please, definitely not a 2" by 2" scrap of paper (we loose them far too easily).

Help us please then we can help you. But please spare an extra thought for Brian Gaff - you never know you may have the same problems one day. *Ed.*

Letters may be edited or shortened to fit on the pages.

This is your letters page so it is up to you to fill it with interesting things. Come on, get writing, on any subject even remotely related to computers. Just keep things as short as you can so we can get as many letters as possible in each month.

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